




MRID NO. 448073-29

**DATA EVALUATION RECORD
FISH LIFE-CYCLE TOXICITY TEST
GUIDELINE 72-5**

1. **CHEMICAL:** Fluazinam PC Code No.: 129098
2. **TEST MATERIAL:** Technical Fluazinam Purity: 97.4%
(IKF-1216)
3. **CITATION:**

Author: Emily Dionne
Title: Technical Fluazinam (IKF-1216) - The Chronic Toxicity to the Fathead Minnow (*Pimephales promelas*) During a Full Life-Cycle Exposure
Study Completion Date: July 25, 1995
Laboratory: Springborn Laboratories, Inc., Wareham, MA
Laboratory Report ID: 94-1-5123
Sponsor: Ishihara Sangyo Kaisha, Ltd., Tokyo, Japan
MRID No.: 448073-29
DP Barcode: Not reported
4. **REVIEWED BY:** Karl Bullock, M.S., Environmental Scientist, Golder Associates Inc.

Signature:  Date: 10/13/99

APPROVED BY: Pim Kosalwat, Ph.D., Senior Scientist, Golder Associates Inc.
Signature:  Date: 10/13/99
5. **APPROVED BY:**  Ph.D. Senior Aquatic Biologist

Signature: Date: 1/10/2001
6. **Study Parameters:**

Test Species: *Pimephales promelas*
Age of Test Organism: <24 hours old embryos
Test Duration: 278 days
Study Method: Flow-Through
Type of Concentrations: Mean measured
7. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements for a fish full life-cycle toxicity test using fathead minnows. Based on mean measured concentrations, the LOEC and NOEC for fathead minnows exposed to Technical Fluazinam were 1.4 and 0.69 ppb, respectively. The geometric mean MATC was estimated to be 0.98 ppb.

Results Synopsis:

Most Sensitive Endpoint: F₁ hatching success

NOEC: 0.69 ppb

LOEC: 1.4 ppb

MATC: 0.98 ppb

8. ADEQUACY OF THE STUDY:

A. Classification: Core.

B. Rationale: Fulfills guideline requirements.

C. Repairability: N/A

9. GUIDELINE DEVIATIONS:

1. Dilution water hardness (25-40 mg/L as CaCO₃) and pH (6.9-7.2) were slightly less than recommended (40-48 mg/L as CaCO₃, pH range of 7.2-7.6).
2. The F₁ larval exposure period (30 days) was less than recommended (8 weeks).
3. Illumination (377 to 1292 lumens) was greater than recommended (10 - 100 lumens).
4. Larval chamber construction material and drain height were not reported.
5. The volume of the embryo incubation cups was not reported.
6. During test days 161 - 278, test aquaria were aerated.
7. Only two replicates were utilized; guidelines recommend using four replicates.

10. SUBMISSION PURPOSE:

11. MATERIALS AND METHODS:**A. Biological System:**

Guideline Criteria	Reported Information
Species: Prefer sheepshead minnow (<i>Cyprinodon variegatus</i>) or fathead minnow (<i>Pimephales promelas</i>).	<i>Pimephales promelas</i>
Source and acclimation	Embryos were obtained from in-house brood stock. Fish were held under conditions similar to testing.
Age at beginning of test: Embryos 2 to 24 hours old	<24 hours old
Feeding: Fish should be fed at least twice daily and should not be fed for at least 24 hours prior to test termination.	Newly hatched fry were fed live brine shrimp nauplii three times daily for the first 26 days. Between days 27 and 29, small amounts of Zeigler Brothers Prime flakes were also offered once daily. Beginning on day 30 (post-hatch), fish were fed twice daily during weekdays, once with frozen brine shrimp and once with flake food. On weekends, fish were fed once daily. Feeding was withheld for 24 hours prior to test termination.

Guideline Criteria	Reported Information
<p>Embryo Exposure (Four-Five Days): Embryos (<24 hours old) from at least 3 separate spawns should be randomly distributed to embryo cups.</p> <p>A minimum of 50 embryos (<24 hrs old) per replicate cup, 4 cups per treatment should be used.</p> <p><u>Parameters measured:</u></p> <ul style="list-style-type: none"> • Survival of embryos • Time required to hatch • Hatching success • Survival of fry for 4 weeks <p>Dead and fungused embryos should be counted and removed daily.</p>	<p>Embryos (<24 hours old) from 18 spawns tiles were randomly distributed to embryo cups.</p> <p>50 embryos per cup (randomly assigned five at a time); 2 cups per replicate test chamber; 2 replicate chambers per treatment and control.</p> <p>All parameters listed at left were measured.</p> <p>Dead embryos were recorded and removed daily until hatching was complete.</p>
<p>Larval-Juvenile Exposure (From Hatch to 8 Weeks): After hatching, each group of larvae is randomly reduced to a minimum of 25 fish and released in replicate larval growth chambers. The random selection must include any fish that are lethargic or deformed.</p> <p><u>Parameters measured:</u></p> <ul style="list-style-type: none"> • Fish survival (determined by counting the number of live fish in each replicate growth chamber weekly). • Total lengths (mm) of all fish at 4 and 8 weeks after hatching. 	<p>95% hatch was complete on Day 5. Larvae from the incubation cups in each control and treatment chamber were impartially reduced to 50 per replicate on Day 5 and released into the larval growth chambers on Day 6 (25 fish per growth chamber, 2 growth chambers per replicate). At 66 days post-hatch, juveniles were impartially reduced to 25 per replicate.</p> <p>Both parameters at left were measured.</p>

Guideline Criteria	Reported Information
<p>Juvenile-Adult Exposure (From 8 wks posthatch to the end of the spawning phase [32-40 wks]):</p> <p>At 20-24 weeks after hatching, mature fish are placed in a spawning tank of the same concentration (4 males and 4 females randomly chosen and assigned). The spawning tank is divided into 4 individual spawning chambers with appropriate spawning substrates.</p> <p>The substrates are examined daily and embryos removed, counted, and recorded separately for each pair.</p> <p>For fathead minnow, adult exposure should be terminated when no spawning occurs for one week.</p> <p>For sheepshead minnow, testing should be terminated after spawning is observed for 2 weeks.</p>	<p>Spawning tanks (2 per treatment) were divided into 3 equal spawning compartments using nylon mesh screen dividers. On Day 161, one male and two females were distributed to each spawning compartment. The remaining adults were left in the exposure aquaria until test termination (Day 278). Spawning substrate consisted of 10-cm sections of 4"-diameter PVC pipe, which were halved and placed concave surface down to form "arches". Two such spawning substrates were provided to each spawning group.</p> <p>Substrates were examined, and embryos were removed and counted daily.</p> <p>The spawning phase was terminated at 278 days post-hatch.</p>
<p>Second Generation Embryo Exposure (4-5 days):</p> <p>50 embryos from each conc. level are randomly selected and transferred to incubation cups for hatch. Use the same test procedures as those for parental generation.</p> <p>Embryos not selected are discarded.</p>	<p>10-15 sets of 50 embryos from each replicate (average of 740 embryos per replicate at test concentrations which did not affect reproduction) were incubated and the percent hatch was determined.</p> <p>Embryos not selected were kept for residue analysis.</p>

Guideline Criteria	Reported Information
<p>Second Generation Larval-Juvenile Exposure (From Hatch to 4-8 wks): After hatching, 25 larvae are released in each growth chambers (2 chambers per treatment).</p> <p>Each group of 2nd generation fish is terminated 8 wks after hatching.</p> <p>Fish are blotted, weighed, and measured before being discarded.</p>	<p>An average of 6 groups (3 per replicate) of 25 larvae from test concentrations which did not affect reproduction were released into growth chambers for each treatment.</p> <p>After 30 days of post-hatch exposure, the 2nd generation fish were terminated.</p> <p>Fish were measured for individual length and wet weight.</p>

Comments: None.

B. Physical System:

Guideline Criteria	Reported Information
<p>Test Water: <u>Sheepshead Minnow</u></p> <ol style="list-style-type: none"> 1. Natural seawater (sterilized and filtered) or a commercial mixture. 2. Natural seawater with a salinity of ≥ 15 parts per thousand (weekly range of salinity $< 6\%$ and monthly pH range < 0.8 pH units). <p><u>Fathead Minnow</u></p> <ol style="list-style-type: none"> 1. Reconstituted water or water from unpolluted well or spring (sterilized and tested for pollutants). 2. Hardness of 40 to 48 mg/L as CaCO_3 and pH of 7.2 to 7.6. 	<ol style="list-style-type: none"> 1. Well water, aerated and passed through an ultraviolet sterilizer before delivery to the proportional diluter. Water was screened semi-annually for contaminants and monthly for TOC 2. The hardness ranged from 24 to 30 mg/L as CaCO_3. The pH ranged from 6.7 to 7.6.

Guideline Criteria	Reported Information
<p>Test Temperature: <u>Fathead</u>: 25°C and should not remain outside the range of 24 to 26°C for more than 48 hours. <u>Sheepshead</u>: 30°C.</p>	<p>Range: 22 - 26°C</p> <p>The temperature of 23°C did not occur for any period > 48 hours. The low temperature of 22°C occurred once for a period of <24 hours.</p>
<p>Photoperiod: 16-hour light/8-hour dark.</p> <p>Light intensity of 10-100 lumens at water surface.</p>	<p>Graduated photoperiod based on dusk to dawn times in Evansville, IN. Range of 10.3 to 15.45 hours of light/day.</p> <p>377 to 644 lumens/m² for exposure aquaria, 969 to 1292 lumens/m² for spawning aquaria.</p>
<p>Dosing Apparatus:</p> <ol style="list-style-type: none"> 1. Intermittent flow proportional diluters or continuous flow serial diluters. 2. A minimum of 5 toxicant concentrations with a dilution factor ≤ 0.5. 3. One control should be used. 	<ol style="list-style-type: none"> 1. Intermittent flow proportional diluter. 2. Five with a dilution factor of 0.5. 3. A dilution water control and a solvent control.
<p>Toxicant Mixing:</p> <ol style="list-style-type: none"> 1. Mixing chamber recommended but not required. 2. Test solution completely mixed before introduction into the test system (aeration should not be used for mixing). 3. Flow splitting accuracy must be within 10% and periodically checked. 	<ol style="list-style-type: none"> 1. Mixing chambers were used 2. Solution in mixing chamber was continuously stirred using a magnetic stirrer. 3. Measured flows were within 4% of nominal.

Guideline Criteria	Reported Information
<p>Exposure System/Test Vessels: Exposure tanks should be all glass or glass with a plastic or stainless steel frame (30.5 x 30.5 x 91.4 cm or 30.5 x 30.5 x 61 cm for fathead, and 45 x 90 x 26 cm for sheephead).</p> <p>Larval chambers should have glass bottoms and drains that allow water to be drawn down to 3 cm.</p> <p>Test water depth in adult tanks and larval chambers should be a minimum of 15 cm.</p>	<p>Each duplicate glass exposure aquarium was 60 x 30 x 30 cm, with two larval growth chambers (30 x 13 x 25 cm) placed in each aquarium.</p> <p>Larval chamber material and drain height were not reported.</p> <p>Test solution volume maintained at 27 L, equivalent to a solution depth of 15 cm.</p>
<p>Embryo and Fry Chambers: 120 ml glass jars with bottoms replaced with 40 mesh stainless steel or nylon screen. Chambers can be oscillated vertically using rocker arm apparatus (2 rpm motor) or placed in separate chambers with self-starting siphons.</p>	<p>Embryo incubation cups were 5 cm diameter glass jars (height not reported) with 40-mesh Nitex® nylon screen bottoms. Two cups were placed within each incubation chamber (7.5 x 16 x 7.5 cm). During each diluter cycle, test solution flowed into and passed through the incubation chamber by means of a self-starting cap-siphon.</p>

Guideline Criteria	Reported Information
<p>Flow Rate: Flow rates to larval cups should provide 90% replacement in 8-12 hours, and maintain DO at above 75% of saturation. The toxicant level cannot drop below 20% with fish in the tank.</p>	<p>Flow rate to exposure tanks during the growth phase (Days 0-161) was 9.3 vol/24 hours (90% replacement in 6 hours). Flow rate to spawning tanks (Days 161-278) was 6.5 vol/24 hours (90% replacement in 8 hours).</p> <p>DO levels ranged from 4.8 - 9.4 mg/L (58 - 114% of saturation); instances of DO levels <75% were corrected within 24 hours. Mean DO levels levels ranged from 84 to 91% of saturation.</p> <p>Toxicant levels remained constant throughout the duration of the study; mean recoveries were 53 - 70% of nominal.</p>
<p>Aeration: Dilution water should be aerated to insure DO concentration at or near 100% saturation. Test tanks and embryo chambers should not be aerated.</p>	<p>Between days 19 and 161, an oxygen saturating column was used to oxygenate the dilution water prior to entering the diluter cells. Between Days 161 and 278, gentle aeration was added to all aquaria.</p>

C. Chemical System:

Guideline Criteria	Reported Information
<p>Concentrations: Minimum of 5 concentrations and a control, all replicated; plus solvent control if appropriate.</p> <p>Toxicant conc. must be measured in one tank at each toxicant level every week.</p>	<p>A dilution water control, solvent control and 5 treatment concentrations: 1.3, 2.5, 5.0, 10, and 20 µg/L.</p> <p>Test solutions were collected at least once per week from each replicate aquarium of the controls and treatments for analysis by GC until the initiation of the spawning period (Day 161). From Day 161 until test termination, samples were taken at least weekly from alternating replicates of each control and treatment for analysis by GC.</p>
<p>Other Variables:</p> <ol style="list-style-type: none"> 1. DO must be measured at each conc. at least once a week. 2. Test water temp. must be recorded continuously. 3. <u>Freshwater</u>: A control and one conc. must be analyzed weekly for pH, alkalinity, hardness, and conductance. <u>Natural seawater</u>: must maintain a constant salinity and not fluctuate more than 6% weekly; monthly pH range <0.8 pH units. 	<ol style="list-style-type: none"> 1. DO was measured daily in alternating replicate aquaria at each treatment level and control. 2. Temperature was measured daily in alternating replicate aquaria at each treatment level and control. Temperature was also measured continuously in one exposure aquaria and one spawning aquaria using several minimum-maximum thermometers. 3. Total hardness, alkalinity, and conductivity were measured weekly in one control aquarium and one treatment level aquarium on a rotating basis.

Guideline Criteria	Reported Information
Solvents: Should not exceed 0.1 ml/L in a flow-through system. Acceptable solvents are: dimethylformamide, triethylene glycol, methanol, acetone, ethanol.	Solvent conc.: 11.5 µL/L Solvent: acetone

12. REPORTED RESULTS:

Guideline Criteria	Reported Information
Data Endpoints must include: <ul style="list-style-type: none"> · survival of F₀ and F₁ embryos, time required to hatch, and hatching success; · survival and total length of F₀ fish at 4 and 8 weeks after hatching; · weights and lengths of F₁ fish at 8 weeks; · incidence of pathological or histological effects; and · observations of other effects or clinical signs. 	All biological parameters listed at left except: The weights and lengths of F ₁ fish were measured at 30 days post-hatch.

F₀ Results:

Nominal Conc. (µg/L)	Mean Measured Conc. (µg/L) (SD)	% Hatch	30-Day Post-Hatch % Survival	61-Day Post-Hatch % Survival	Test Termination (Day 278) % Survival
Control	<MDL*	88	89	89	88
Solvent Control	<MDL	89	85	85	90
1.3 <i>1.6</i>	0.69 (0.22)	85	94	94	100
2.5 <i>1.4</i>	1.4 (0.3)	80	89	89	100
5.0 <i>2.9</i>	2.9 (0.7)	85	86	86	96
10.0 <i>6.4</i>	6.4 (1.2)	83	81	81	90
20.0 <i>14</i>	14 (2.0)	63**	32**	32**	62**

* Minimum Detection Limit = 0.0954 µg/L, mean procedural recovery = 103%.

** Statistically different from the solvent control.

Mean Measured Concentration (µg/L)	Mean Total Length (mm)				Wet Weight (g)		
	30-Day	61-Day	278-Day (Male)	278-Day (Fem.)	61-Day	278-Day (Male)	278-Day (Fem.)
Control	31	40	86	70	0.563	8.3	4.1
Solvent Control	30	41	87	66	0.613	8.5	3.3
0.69	31	40	84	67	0.569	7.8	3.2
1.4	31	40	87	66	0.584	8.3	3.2
2.9	31	41	85	66	0.664	7.6*	3.1
6.4	29	40	83	65	0.608	7.2*	3.1
14	28*	41	81	67	-**	6.9*	3.5

* Statistically different from the solvent control.

** No 61-day weight data were reported for the 14 µg/L treatment due to reduced survival (no fish were terminated).

Mean Measured Concentration ($\mu\text{g/L}$)	Number of Spawns	Total Number of Eggs	Number of Eggs/Spawn	Number of Spawns/Female	Number Eggs/Female
Control	38	3942	104	8	841
Solvent Control	51	3810	73	9	679
0.69	63	6333	98	10	1056
1.4	37	2850	80	6	475
2.9	39	3233	83	7	539
6.4	14	503	35	2*	84
14	31	2648	75	5*	442

* Significantly different from the solvent control.

F₁ Results:

*Transfer from
1.4-14 $\mu\text{g/L}$
growth of larvae
3.4-14 $\mu\text{g/L}$*

	% Hatch	30-Day Post-Hatch % Survival	30-Day Post-Hatch Length (mm)	30-Day Post-Hatch Wet Weight (g)
	85	92	30	0.25
Control	88	94	30	0.26
0.69	89	89	30	0.26
1.4	78*	76	30	0.26
2.9	76*	95	30	0.25
6.4	93**	92**	29	0.23*
14	27*	80**	26*	0.17*

* Statistically different from the solvent control.

** No embryos incubated or larval groups exposed in replicate B due to reduced spawning activity. Therefore the data for this parameter at this treatment level were not included in the statistical analysis due to the lack of replication.

Toxicity Observations: Physical and behavioral abnormalities noted in the F₀ fish included scoliosis, cranial malformations, and protruding eyes. Five cases of scoliosis were observed, two in the dilution water control, one in the solvent control, and two in the 0.69 µg/L treatment. Three cranial malformations were noted, two in the dilution water control and one in the 6.4 µg/L treatment. Two cases of protruding eyes occurred, one in the 1.4 µg/L treatment and one in the 6.4 µg/L treatment. One case of scoliosis was observed within the F₁ fish.

Statistical Results:

Statistical Method: Williams' test for growth and reproduction; were used for continuous data (length and weight) and Fisher's Exact test was used for survival and hatching success. All treatment data were compared to those of the pooled control.

Biological Endpoint	NOEC (µg/L)	LOEC (µg/L)
F ₀ hatching success	6.4	14
F ₀ 30-day survival	6.4	14
F ₀ 30-day length	2.9	6.4
F ₀ 61-day survival	6.4	14
F ₀ 61-day length	>6.4	14
F ₀ 61-day weight	>6.4	14
F ₀ 278-day survival	6.4	14
F ₀ 278-day length (Males)	2.9	6.4
F ₀ 278-day length (Females)	6.4	>6.4
F ₀ 278-day weight (Males)	2.9	6.4
F ₀ 278-day weight (Females)	6.4	>6.4
F ₀ # of spawns/female	2.9	6.4
F ₀ # of eggs/female	14	>14
F ₁ hatching success	0.69	1.4
F ₁ 30 day survival	6.4	14
F ₁ 30 day length	2.9	>2.9
F ₁ 30 day weight	2.9	>2.9

NOEC: 0.69 µg/L

LOEC: 1.4 µg/L

MATC: 0.98 µg/L

13. REVIEWER'S STATISTICAL RESULTS:

Statistical Method: Bonferroni's Test and Dunnett's Test were used for continuous data (length and weight) and Williams' Test was used for survival and hatching success. All comparisons were made against the solvent control.

Biological Endpoint	NOEC ($\mu\text{g/L}$)	LOEC ($\mu\text{g/L}$)
F ₀ hatching success	6.4	14
F ₀ 30-day survival	6.4	14
F ₀ 30-day length	6.4	14
F ₀ 61-day survival	6.4	14
F ₀ 61-day length	14	>14
F ₀ 278-day survival	6.4	14
F ₀ 278-day length (Males)	2.9	6.4
F ₀ 278-day length (Females)	14	>14
F ₀ 278-day weight (Males)	1.4	2.9
F ₀ 278-day weight (Females)	14	>14
F ₀ # of spawns/female	2.9	6.4
F ₀ # of eggs/female	14	>14
F ₁ hatching success	0.69	1.4
F ₁ 30 day survival	6.4	14
F ₁ 30 day length	6.4	14
F ₁ 30 day weight	2.9	6.4

Most sensitive endpoint(s): F₁ hatching success

NOEC: 0.69 ppb

LOEC: 1.4 ppb

MATC: 0.98 ppb

Comments: No data were reported for the 61-day weight of F₀ fish in the 14 $\mu\text{g/L}$ treatment. Statistical analyses of 30-day F₁ larval survival using Williams' test was not possible due to the limited degrees of freedom. The author's results were used for the NOEC and LOEC for this endpoint.

14. **REVIEWER'S COMMENTS:** This study is scientifically sound and fulfills the guideline requirements for a fish full life-cycle toxicity test using fathead minnows. The NOEC and LOEC for fathead minnows exposed to Technical Fluazinam were 0.69 and 1.4 ppb, respectively. The geometric mean MATC was 0.98 ppb. This study is classified as **Core**.

Technical Fluazinam - Fathead Life Cycle - F0 % Hatch
 File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent	2	0.890	1.238	1.238
2	0.69	2	0.845	1.167	1.167
3	1.4	2	0.795	1.102	1.139
4	2.9	2	0.850	1.174	1.139
5	6.4	2	0.825	1.140	1.139
6	14	2	0.630	0.917	0.917

Technical Fluazinam - Fathead Life Cycle - F0 % Hatch
 File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent	1.238				
0.69	1.167	1.392		1.94	k= 1, v= 6
1.4	1.139	1.937		2.06	k= 2, v= 6
2.9	1.139	1.937		2.10	k= 3, v= 6
6.4	1.139	1.937		2.12	k= 4, v= 6
14	0.917	6.248	*	2.13	k= 5, v= 6

s = 0.051

Note: df used for table values are approximate when v > 20.

Technical Fluazinam - Fathead Life Cycle - F0 30-day % Survival
 File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent	2	0.845	1.166	1.246
2	0.69	2	0.940	1.327	1.246
3	1.4	2	0.890	1.241	1.241
4	2.9	2	0.860	1.191	1.191
5	6.4	2	0.810	1.120	1.120
6	14	2	0.320	0.601	0.601

Technical Fluazinam - Fathead Life Cycle - F0 30-day % Survival
 File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent	1.246				
0.69	1.246	1.176		1.94	k= 1, v= 6
1.4	1.241	1.100		2.06	k= 2, v= 6
2.9	1.191	0.361		2.10	k= 3, v= 6
6.4	1.120	0.678		2.12	k= 4, v= 6
14	0.601	8.286	*	2.13	k= 5, v= 6

s = 0.068

Note: df used for table values are approximate when v > 20.

Fluazinam - F0 % Survival at Termination
 File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent	2	0.900	1.251	1.397
2	0.69	2	1.000	1.471	1.397
3	1.4	2	1.000	1.471	1.397
4	2.9	2	0.960	1.377	1.377
5	6.4	2	0.900	1.251	1.251
6	14	2	0.620	0.908	0.908

Fluazinam - F0 % Survival at Termination
 File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent	1.397				
0.69	1.397	2.090	* ^a	1.94	k= 1, v= 6
1.4	1.397	2.090	* ^a	2.06	k= 2, v= 6
2.9	1.377	1.806		2.10	k= 3, v= 6
6.4	1.251	0.000		2.12	k= 4, v= 6
14	0.908	4.885	*	2.13	k= 5, v= 6

s = 0.070

Note: df used for table values are approximate when v > 20.

a = significantly higher than the solvent control.

Fluazinam - # Spawns/Female

File: 44807329 Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model)

TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent	2	9.500	9.500	10.000
2	0.69	2	10.500	10.500	10.000
3	1.4	2	6.500	6.500	6.500
4	2.9	2	6.500	6.500	6.500
5	6.4	2	2.500	2.500	3.750
6	14	2	5.000	5.000	3.750

Fluazinam - # Spawns/Female

File: 44807329 Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model)

TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent	10.000				
0.69	10.000	0.285		1.94	k= 1, v= 6
1.4	6.500	1.708		2.06	k= 2, v= 6
2.9	6.500	1.708		2.10	k= 3, v= 6
6.4	3.750	3.275	*	2.12	k= 4, v= 6
14	3.750	3.275	*	2.13	k= 5, v= 6

s = 1.756

Note: df used for table values are approximate when v > 20.

Fluazinam - # Eggs/Female

File: 44807329 Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent	2	679.000	679.000	867.250
2	0.69	2	1055.500	1055.500	867.250
3	1.4	2	475.000	475.000	507.000
4	2.9	2	539.000	539.000	507.000
5	6.4	2	84.000	84.000	262.750
6	14	2	441.500	441.500	262.750

Fluazinam - # Eggs/Female

File: 44807329 Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent	867.250				
0.69	867.250	0.637		1.94	k= 1, v= 6
1.4	507.000	0.582		2.06	k= 2, v= 6
2.9	507.000	0.582		2.10	k= 3, v= 6
6.4	262.750	1.408		2.12	k= 4, v= 6
14	262.750	1.408		2.13	k= 5, v= 6

s = 295.691

Note: df used for table values are approximate when v > 20.

Fluazinam - F1 % Hatch

File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	Solvent	2	0.885	1.227	1.227
2	0.69	2	0.885	1.225	1.225
3	1.4	2	0.780	1.088	1.088
4	2.9	2	0.760	1.059	1.059
5	14	2	0.265	0.540	0.540

Fluazinam - F1 % Hatch

File: 44807329 Transform: ARC SINE(SQUARE ROOT(Y))

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
Solvent	1.227				
0.69	1.225	0.019		2.02	k= 1, v= 5
1.4	1.088	2.162	*	2.14	k= 2, v= 5
2.9	1.059	2.608	*	2.19	k= 3, v= 5
14	0.540	10.668	*	2.21	k= 4, v= 5

s = 0.064

Note: df used for table values are approximate when v > 20.

File:448073F0.sas Page 1
 Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

----- TRT=1.3 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	89	30.5280899	2.8488031	24.0000000	37.0000000
SDWT	43	0.5690744	0.1381525	0.3188000	0.9662000
SDLEN	43	39.6046512	3.0561377	33.0000000	48.0000000
TMALEN	26	83.5107692	5.0826937	70.3300000	90.6800000
TFEMLEN	24	66.5300000	3.4522532	60.7700000	73.6000000
TMALWT	26	7.6583500	1.2406429	5.4734000	10.1401000
TFEMWT	24	3.1969917	0.6063714	2.0969000	4.1237000

----- TRT=10 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	74	29.2972973	2.5196745	20.0000000	34.0000000
SDWT	31	0.6091258	0.1502169	0.2809000	0.8830000
SDLEN	31	40.2580645	3.1301517	33.0000000	46.0000000
TMALEN	22	82.7604545	5.6369398	69.2000000	98.9200000
TFEMLEN	23	65.6334783	5.8886166	57.7700000	86.9000000
TMALWT	22	7.1528545	1.4694040	3.9670000	10.5090000
TFEMWT	23	3.0515565	0.6556998	1.5652000	4.0551000

----- TRT=2.5 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	80	31.0500000	3.4673888	19.0000000	50.0000000
SDWT	39	0.5847000	0.1593163	0.3078000	0.9096000
SDLEN	39	40.0000000	3.1119464	33.0000000	45.0000000
TMALEN	23	86.6730435	3.1118679	81.3600000	92.0900000
TFEMLEN	26	66.2242308	3.2425585	58.6300000	72.1200000
TMALWT	23	8.3268522	1.0109323	6.8346000	11.0547000
TFEMWT	26	3.1625269	0.5691127	2.0823000	4.6132000

----- TRT=20 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	31	27.7741935	2.8485046	21.0000000	34.0000000
SDWT	0				
SDLEN	17	40.8823529	3.3519090	33.0000000	46.0000000
TMALEN	15	81.4806667	5.8479868	71.5500000	90.7400000
TFEMLEN	15	66.8866667	5.5431150	59.9500000	78.5300000
TMALWT	15	6.7968600	1.2537928	4.6726000	9.7062000
TFEMWT	15	3.4450000	0.9384387	2.4349000	5.3977000

Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

----- TRT=5 -----

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	85	30.6352941	2.8066548	22.0000000	40.0000000
SDWT	36	0.6631278	0.1613478	0.4200000	1.2577000
SDLEN	36	41.4166667	2.9507868	36.0000000	48.0000000

File:448073F0.sas Page 2
 TMALEN 27 84.4418519 4.6204004 74.7100000 96.7600000
 TFEMLEN 21 66.1719048 4.4393531 59.6300000 78.4800000
 TMALWT 27 7.6088630 1.2123531 5.3084000 10.3786000
 TFEMWT 21 3.1120238 0.7397190 2.1722000 5.3055000

----- TRT=Solvent -----

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	80	30.3250000	2.7959057	21.0000000	36.0000000
SDWT	35	0.6128229	0.1378160	0.2761000	0.9974000
SDLEN	35	40.6857143	2.5641353	34.0000000	46.0000000
TMALEN	26	86.7865385	4.9362706	75.2500000	96.2000000
TFEMLEN	18	66.4877778	2.7608046	61.4000000	71.2400000
TMALWT	26	8.4166577	1.1019555	6.6583000	10.4703000
TFEMWT	18	3.3026111	0.5608087	2.4017000	4.2700000

Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

General Linear Models Procedure
 Class Level Information

Class	Levels	Values
TRT	6	1.3 10 2.5 20 5 Solvent (Nominal)
REP	24	1Aa 1Ab 1Ba 1Bb 2Aa 2Ab 2Ba 2Bb 3Aa 3Ab 3Ba 3Bb 4Aa 4Ab 4Ba 4Bb 5Aa 5Ab 5Ba 5Bb 6Aa 6Ab 6Ba 6Bb

Number of observations in data set = 463

Group	Obs	Dependent Variables
1	439	THDLEN
2	184	SDWT
3	201	SDLEN
4	139	TMALEN
5	127	TFEMLEN TFEMWT
6	139	TMALWT

NOTE: Variables in each group are consistent with respect to the presence or absence of missing values.

Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dependent Variable: THDLEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	23	539.78874	23.46908	2.83	0.0001
Error	415	3437.76023	8.28376		
Corrected Total	438	3977.54897			

File:448073F0.sas Page 3
 R-Square C.V. Root MSE THDLEN Mean
 0.135709 9.528724 2.8782 30.205

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	327.44627	65.48925	7.91	0.0001
REP	18	212.34248	11.79680	1.42	0.1156

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.00000			
REP	18	212.34248	11.79680	1.42	0.1156

Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

General Linear Models Procedure
 Least Squares Means

TRT	THDLEN LSMEAN
1.3	Non-est
10	Non-est
2.5	Non-est
20	Non-est
5	Non-est
Solvent	Non-est

Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: THDLEN

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 415 MSE= 8.28376
 Critical Value of T= 2.95229

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
2.5 - 5	-0.9089	0.4147	1.7383
2.5 - 1.3	-0.7872	0.5219	1.8310
2.5 - Solvent	-0.6185	0.7250	2.0685
2.5 - 10	0.3822	1.7527	3.1232
2.5 - 20	1.4781	3.2758	5.0735
5 - 2.5	-1.7783	-0.4147	0.9089
5 - 1.3	-1.1815	0.1072	1.3959
5 - Solvent	-1.0133	0.3103	1.6339
5 - 10	-0.0130	1.3380	2.6890
5 - 20	1.0783	2.8611	4.6439
1.3 - 2.5	-1.8310	-0.5219	0.7872
1.3 - 5	-1.3959	-0.1072	1.1815
1.3 - Solvent	-1.1060	0.2031	1.5122

File:448073F0.sas Page 4

1.3 - 10	-0.1060	1.2308	2.5676	
1.3 - 20	0.9818	2.7539	4.5260	***
Solvent - 2.5	-2.0685	-0.7250	0.6185	
Solvent - 5	-1.6339	-0.3103	1.0133	
Solvent - 1.3	-1.5122	-0.2031	1.1060	
Solvent - 10	-0.3428	1.0277	2.3982	
Solvent - 20	0.7531	2.5508	4.3485	***
10 - 2.5	-3.1232	-1.7527	-0.3822	***
10 - 5	-2.6890	-1.3380	0.0130	
10 - 1.3	-2.5676	-1.2308	0.1060	
10 - Solvent	-2.3982	-1.0277	0.3428	
10 - 20	-0.2948	1.5231	3.3410	
20 - 2.5	-5.0735	-3.2758	-1.4781	***
20 - 5	-4.6439	-2.8611	-1.0783	***
20 - 1.3	-4.5260	-2.7539	-0.9818	***
20 - Solvent	-4.3485	-2.5508	-0.7531	***
20 - 10	-3.3410	-1.5231	0.2948	

Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: THDLEN

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 415 MSE= 8.28376
 Critical Value of Dunnett's T= 2.254

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
2.5 - Solvent	-0.3006	0.7250	1.7506
5 - Solvent	-0.7002	0.3103	1.3207
1.3 - Solvent	-0.7963	0.2031	1.2025
10 - Solvent	-2.0739	-1.0277	0.0185
20 - Solvent	-3.9232	-2.5508	-1.1785

Technical Fluazinam: Fathead Minnow F0 Life Cycle
 10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dependent Variable: SDWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.2200770	0.0244530	1.07	0.3871
Error	174	3.9756684	0.0228487		
Corrected Total	183	4.1957454			

R-Square	C.V.	Root MSE	SDWT Mean
0.052452	24.94939	0.1512	0.6059

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	4	0.1957418	0.0489354	2.14	0.0777
REP	5	0.0243352	0.0048670	0.21	0.9566

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.0000000			
REP	5	0.0243352	0.0048670	0.21	0.9566

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure
Least Squares Means

TRT	SDWT LSMEAN
1.3	Non-est
10	Non-est
2.5	Non-est
5	Non-est
Solvent	Non-est

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: SDWT

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 174 MSE= 0.022849
Critical Value of T= 2.84327

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
5 - Solvent	-0.05172	0.05030	0.15233
5 - 10	-0.05130	0.05400	0.15931
5 - 2.5	-0.02091	0.07843	0.17776
5 - 1.3	-0.00304	0.09405	0.19114
Solvent - 5	-0.15233	-0.05030	0.05172
Solvent - 10	-0.10230	0.00370	0.10970
Solvent - 2.5	-0.07195	0.02812	0.12819
Solvent - 1.3	-0.05409	0.04375	0.14159
10 - 5	-0.15931	-0.05400	0.05130
10 - Solvent	-0.10970	-0.00370	0.10230
10 - 2.5	-0.07899	0.02443	0.12784
10 - 1.3	-0.06121	0.04005	0.14131
2.5 - 5	-0.17776	-0.07843	0.02091
2.5 - Solvent	-0.12819	-0.02812	0.07195
2.5 - 10	-0.12784	-0.02443	0.07899
2.5 - 1.3	-0.07941	0.01563	0.11066
1.3 - 5	-0.19114	-0.09405	0.00304

1.3	- Solvent	-0.14159	-0.04375	0.05409
1.3	- 10	-0.14131	-0.04005	0.06121
1.3	- 2.5	-0.11066	-0.01563	0.07941

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: SDWT

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 174 MSE= 0.022849
Critical Value of Dunnett's T= 2.172

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
5 - Solvent	-0.02763	0.05030	0.12824
10 - Solvent	-0.08467	-0.00370	0.07728
2.5 - Solvent	-0.10457	-0.02812	0.04832
1.3 - Solvent	-0.11849	-0.04375	0.03099

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dependent Variable: SDLEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	123.11544	11.19231	1.23	0.2683
Error	189	1717.24277	9.08594		
Corrected Total	200	1840.35821			
R-Square		C.V.	Root MSE	SDLEN Mean	
0.066898		7.460561	3.0143	40.403	

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	78.086092	15.617218	1.72	0.1321
REP	6	45.029350	7.504892	0.83	0.5511
Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.000000			
REP	6	45.029350	7.504892	0.83	0.5511

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure
Least Squares Means

TRT	SDLEN LSMEAN
1.3	Non-est
10	Non-est
2.5	Non-est
20	Non-est
5	Non-est
Solvent	Non-est

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: SDLEN

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 189 MSE= 9.085941
Critical Value of T= 2.97297

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
5 - 20	-2.1029	0.5343	3.1715
5 - Solvent	-1.3963	0.7310	2.8582
5 - 10	-1.0371	1.1586	3.3543
5 - 2.5	-0.6545	1.4167	3.4879
5 - 1.3	-0.2124	1.8120	3.8365
20 - 5	-3.1715	-0.5343	2.1029
20 - Solvent	-2.4526	0.1966	2.8459
20 - 10	-2.0802	0.6243	3.3288
20 - 2.5	-1.7221	0.8824	3.4868
20 - 1.3	-1.2897	1.2777	3.8451
Solvent - 5	-2.8582	-0.7310	1.3963
Solvent - 20	-2.8459	-0.1966	2.4526
Solvent - 10	-1.7826	0.4276	2.6379
Solvent - 2.5	-1.4008	0.6857	2.7722
Solvent - 1.3	-0.9591	1.0811	3.1212
10 - 5	-3.3543	-1.1586	1.0371
10 - 20	-3.3288	-0.6243	2.0802
10 - Solvent	-2.6379	-0.4276	1.7826
10 - 2.5	-1.8982	0.2581	2.4144
10 - 1.3	-1.4580	0.6534	2.7648
2.5 - 5	-3.4879	-1.4167	0.6545
2.5 - 20	-3.4868	-0.8824	1.7221
2.5 - Solvent	-2.7722	-0.6857	1.4008
2.5 - 10	-2.4144	-0.2581	1.8982
2.5 - 1.3	-1.5863	0.3953	2.3770
1.3 - 5	-3.8365	-1.8120	0.2124
1.3 - 20	-3.8451	-1.2777	1.2897
1.3 - Solvent	-3.1212	-1.0811	0.9591
1.3 - 10	-2.7648	-0.6534	1.4580
1.3 - 2.5	-2.3770	-0.3953	1.5863

Technical Fluazinam: Fathead Minnow F0 Life Cycle

10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: SDLEN

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 189 MSE= 9.085941
Critical Value of Dunnett's T= 2.257

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
5 - Solvent	-0.8843	0.7310	2.3462
20 - Solvent	-1.8149	0.1966	2.2082
10 - Solvent	-2.1059	-0.4276	1.2506
2.5 - Solvent	-2.2700	-0.6857	0.8986
1.3 - Solvent	-2.6301	-1.0811	0.4680

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dependent Variable: TMALEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	617.50263	51.45855	2.14	0.0184
Error	126	3025.04686	24.00831		
Corrected Total	138	3642.54949			

R-Square	C.V.	Root MSE	TMALEN Mean
0.169525	5.799313	4.8998	84.490

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	473.38124	94.67625	3.94	0.0023
REP	7	144.12140	20.58877	0.86	0.5421
Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.00000			
REP	7	144.12140	20.58877	0.86	0.5421

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure
Least Squares Means

TRT	TMALEN LSMEAN
1.3	Non-est
10	Non-est

2.5 Non-est
20 Non-est
5 Non-est
Solvent Non-est

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: TMALEN

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 126 MSE= 24.00831
Critical Value of T= 2.99220

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
Solvent - 2.5	-4.083	0.113	4.310	
Solvent - 5	-1.684	2.345	6.373	
Solvent - 1.3	-0.791	3.276	7.342	
Solvent - 10	-0.221	4.026	8.273	
Solvent - 20	0.552	5.306	10.060	***
2.5 - Solvent	-4.310	-0.113	4.083	
2.5 - 5	-1.929	2.231	6.391	
2.5 - 1.3	-1.035	3.162	7.359	
2.5 - 10	-0.460	3.913	8.285	
2.5 - 20	0.327	5.192	10.058	***
5 - Solvent	-6.373	-2.345	1.684	
5 - 2.5	-6.391	-2.231	1.929	
5 - 1.3	-3.097	0.931	4.960	
5 - 10	-2.530	1.681	5.892	
5 - 20	-1.760	2.961	7.683	
1.3 - Solvent	-7.342	-3.276	0.791	
1.3 - 2.5	-7.359	-3.162	1.035	
1.3 - 5	-4.960	-0.931	3.097	
1.3 - 10	-3.497	0.750	4.997	
1.3 - 20	-2.724	2.030	6.784	
10 - Solvent	-8.273	-4.026	0.221	
10 - 2.5	-8.285	-3.913	0.460	
10 - 5	-5.892	-1.681	2.530	
10 - 1.3	-4.997	-0.750	3.497	
10 - 20	-3.629	1.280	6.189	
20 - Solvent	-10.060	-5.306	-0.552	***
20 - 2.5	-10.058	-5.192	-0.327	***
20 - 5	-7.683	-2.961	1.760	
20 - 1.3	-6.784	-2.030	2.724	
20 - 10	-6.189	-1.280	3.629	

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: TMALEN

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 126 MSE= 24.00831
Critical Value of Dunnett's T= 2.270

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
2.5 - Solvent	-3.298	-0.113	3.071	
5 - Solvent	-5.401	-2.345	0.712	
1.3 - Solvent	-6.361	-3.276	-0.191	***
10 - Solvent	-7.248	-4.026	-0.804	***
20 - Solvent	-8.913	-5.306	-1.699	***

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dependent Variable: TFEMLEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	307.33763	23.64136	1.36	0.1899
Error	113	1964.13478	17.38172		
Corrected Total	126	2271.47241			
R-Square		C.V.	Root MSE	TFEMLEN Mean	
		0.135303	6.290005	4.1691	66.282

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	17.73728	3.54746	0.20	0.9602
REP	8	289.60035	36.20004	2.08	0.0432
Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.00000			
REP	8	289.60035	36.20004	2.08	0.0432

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dependent Variable: TFEMWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	10.161883	0.781683	1.91	0.0360
Error	113	46.261610	0.409395		
Corrected Total	126	56.423492			
R-Square		C.V.	Root MSE	TFEMWT Mean	
		0.180100	20.03375	0.6398	3.1938

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	1.7911097	0.3582219	0.88	0.5003
REP	8	8.3707730	1.0463466	2.56	0.0134

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.0000000			
REP	8	8.3707730	1.0463466	2.56	0.0134

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure
Least Squares Means

TRT	TFEMLEN LSMEAN	TFEMWT LSMEAN
1.3	Non-est	Non-est
10	Non-est	Non-est
2.5	Non-est	Non-est
20	Non-est	Non-est
5	Non-est	Non-est
Solvent	Non-est	Non-est

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: TFEMLEN

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 113 MSE= 17.38172
Critical Value of T= 2.99888

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
20 - 1.3	-3.758	0.357	4.472
20 - Solvent	-3.972	0.399	4.770
20 - 2.5	-3.391	0.662	4.716
20 - 5	-3.512	0.715	4.941
20 - 10	-2.896	1.253	5.403
1.3 - 20	-4.472	-0.357	3.758
1.3 - Solvent	-3.856	0.042	3.941
1.3 - 2.5	-3.233	0.306	3.845
1.3 - 5	-3.378	0.358	4.094
1.3 - 10	-2.752	0.897	4.545
Solvent - 20	-4.770	-0.399	3.972
Solvent - 1.3	-3.941	-0.042	3.856
Solvent - 2.5	-3.570	0.264	4.097
Solvent - 5	-3.700	0.316	4.332
Solvent - 10	-3.080	0.854	4.789
2.5 - 20	-4.716	-0.662	3.391

2.5	- 1.3	-3.845	-0.306	3.233
2.5	- Solvent	-4.097	-0.264	3.570
2.5	- 5	-3.616	0.052	3.721
2.5	- 10	-2.988	0.591	4.170

5	- 20	-4.941	-0.715	3.512
5	- 1.3	-4.094	-0.358	3.378
5	- Solvent	-4.332	-0.316	3.700
5	- 2.5	-3.721	-0.052	3.616
5	- 10	-3.235	0.538	4.312

10	- 20	-5.403	-1.253	2.896
10	- 1.3	-4.545	-0.897	2.752
10	- Solvent	-4.789	-0.854	3.080
10	- 2.5	-4.170	-0.591	2.988
10	- 5	-4.312	-0.538	3.235

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: TFEMWT

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 113 MSE= 0.409395
Critical Value of T= 2.99888

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
20 - Solvent	-0.5284	0.1424	0.8132
20 - 1.3	-0.3835	0.2480	0.8796
20 - 2.5	-0.3397	0.2825	0.9046
20 - 5	-0.3157	0.3330	0.9817
20 - 10	-0.2434	0.3934	1.0303
Solvent - 20	-0.8132	-0.1424	0.5284
Solvent - 1.3	-0.4927	0.1056	0.7039
Solvent - 2.5	-0.4483	0.1401	0.7284
Solvent - 5	-0.4257	0.1906	0.8069
Solvent - 10	-0.3528	0.2511	0.8549
1.3 - 20	-0.8796	-0.2480	0.3835
1.3 - Solvent	-0.7039	-0.1056	0.4927
1.3 - 2.5	-0.5087	0.0345	0.5776
1.3 - 5	-0.4884	0.0850	0.6583
1.3 - 10	-0.4145	0.1454	0.7053
2.5 - 20	-0.9046	-0.2825	0.3397
2.5 - Solvent	-0.7284	-0.1401	0.4483
2.5 - 1.3	-0.5776	-0.0345	0.5087
2.5 - 5	-0.5125	0.0505	0.6135
2.5 - 10	-0.4383	0.1110	0.6602
5 - 20	-0.9817	-0.3330	0.3157
5 - Solvent	-0.8069	-0.1906	0.4257
5 - 1.3	-0.6583	-0.0850	0.4884
5 - 2.5	-0.6135	-0.0505	0.5125
5 - 10	-0.5187	0.0605	0.6396

10	- 20	-1.0303	-0.3934	0.2434
10	- Solvent	-0.8549	-0.2511	0.3528
10	- 1.3	-0.7053	-0.1454	0.4145
10	- 2.5	-0.6602	-0.1110	0.4383
10	- 5	-0.6396	-0.0605	0.5187

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: TFEMLEN

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 113 MSE= 17.38172
Critical Value of Dunnett's T= 2.244

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison		Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
20	- Solvent	-2.872	0.399	3.670
1.3	- Solvent	-2.875	0.042	2.959
2.5	- Solvent	-3.132	-0.264	2.605
5	- Solvent	-3.321	-0.316	2.689
10	- Solvent	-3.799	-0.854	2.090

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: TFEMWT

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 113 MSE= 0.409395
Critical Value of Dunnett's T= 2.244

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison		Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit
20	- Solvent	-0.3596	0.1424	0.6444
1.3	- Solvent	-0.5533	-0.1056	0.3421
2.5	- Solvent	-0.5803	-0.1401	0.3002
5	- Solvent	-0.6518	-0.1906	0.2706
10	- Solvent	-0.7029	-0.2511	0.2008

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dependent Variable: TMALWT

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
--------	----	----------------	-------------	---------	--------

Model	12	58.812362	4.901030	3.44	0.0002
Error	126	179.444612	1.424164		
Corrected Total	138	238.256974			

R-Square	C.V.	Root MSE	TMALWT Mean
0.246844	15.44189	1.1934	7.7282

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	41.370942	8.274188	5.81	0.0001
REP	7	17.441420	2.491631	1.75	0.1033

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.000000			
REP	7	17.441420	2.491631	1.75	0.1033

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure
Least Squares Means

TRT	TMALWT LSMEAN
1.3	Non-est
10	Non-est
2.5	Non-est
20	Non-est
5	Non-est
Solvent	Non-est

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: TMALWT

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 126 MSE= 1.424164
Critical Value of T= 2.99220

Comparisons significant at the 0.05 level are indicated by '****'.

TRT Comparison		Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
Solvent	- 2.5	-0.9324	0.0898	1.1120	
Solvent	- 1.3	-0.2321	0.7583	1.7487	
Solvent	- 5	-0.1734	0.8078	1.7890	
Solvent	- 10	0.2294	1.2638	2.2982	***
Solvent	- 20	0.4620	1.6198	2.7776	***
2.5	- Solvent	-1.1120	-0.0898	0.9324	
2.5	- 1.3	-0.3537	0.6685	1.6907	

2.5	- 5	-0.2952	0.7180	1.7312	***
2.5	- 10	0.1091	1.1740	2.2389	***
2.5	- 20	0.3449	1.5300	2.7151	***
1.3	- Solvent	-1.7487	-0.7583	0.2321	
1.3	- 2.5	-1.6907	-0.6685	0.3537	
1.3	- 5	-0.9317	0.0495	1.0306	
1.3	- 10	-0.5289	0.5055	1.5399	
1.3	- 20	-0.2963	0.8615	2.0193	
5	- Solvent	-1.7890	-0.8078	0.1734	
5	- 2.5	-1.7312	-0.7180	0.2952	
5	- 1.3	-1.0306	-0.0495	0.9317	
5	- 10	-0.5696	0.4560	1.4816	
5	- 20	-0.3379	0.8120	1.9619	
10	- Solvent	-2.2982	-1.2638	-0.2294	***
10	- 2.5	-2.2389	-1.1740	-0.1091	***
10	- 1.3	-1.5399	-0.5055	0.5289	
10	- 5	-1.4816	-0.4560	0.5696	
10	- 20	-0.8397	0.3560	1.5517	
20	- Solvent	-2.7776	-1.6198	-0.4620	***
20	- 2.5	-2.7151	-1.5300	-0.3449	***
20	- 1.3	-2.0193	-0.8615	0.2963	
20	- 5	-1.9619	-0.8120	0.3379	
20	- 10	-1.5517	-0.3560	0.8397	

Technical Fluazinam: Fathead Minnow F0 Life Cycle
10:23 Thursday, September 30, 1999

General Linear Models Procedure

Dunnnett's One-tailed T tests for variable: TMALWT

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 126 MSE= 1.424164
Critical Value of Dunnnett's T= 2.270

Comparisons significant at the 0.05 level are indicated by ****.

TRT Comparison	Simultaneous		Difference		Simultaneous
	Lower Confidence Limit		Between Means	Upper Confidence Limit	
2.5 - Solvent	-0.8653		-0.0898	0.6857	***
1.3 - Solvent	-1.5097		-0.7583	-0.0069	***
5 - Solvent	-1.5522		-0.8078	-0.0634	***
10 - Solvent	-2.0486		-1.2638	-0.4790	***
20 - Solvent	-2.4982		-1.6198	-0.7413	***

TRT=I

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	155	30.4047742	2.3779756	12.9600000	35.1200000
THDWT	155	0.2610077	0.0577960	0.0269000	0.4136000

TRT=II

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	91	29.5672527	1.6680615	23.8000000	33.0900000
THDWT	91	0.2572560	0.0501795	0.1165000	0.3672000

TRT=III

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	142	29.7021831	2.3166169	20.7300000	34.0900000
THDWT	142	0.2507711	0.0620282	0.0648000	0.3814000

TRT=IV

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	47	29.4106383	2.0611071	25.1300000	35.5900000
THDWT	46	0.2295370	0.0628397	0.1314000	0.4645000

TRT=Solvent

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	141	29.8889362	1.5869552	24.9700000	33.5000000
THDWT	140	0.2583421	0.0492993	0.1347000	0.3876000

TRT=V

Variable	N	Mean	Std Dev	Minimum	Maximum
THDLEN	22	25.8768182	3.8359309	16.4300000	32.4400000
THDWT	20	0.1662250	0.0762581	0.0390000	0.3383000

Technical Fluazinam: Fathead Minnow F1 Life Cycle
 15:08 Wednesday, September 29, 1999

General Linear Models Procedure
 Class Level Information

Class	Levels	Values
TRT	6	I II III IV Solvent V
REP	24	1Aa 2Aa 2Ab 3AC 3Aa 3Ab 3Ba 3Bb 4Aa 4Ab 4Ba 4Bb 4Bc 5Aa 5Ab 5Ac 5Ba 5Bb 5Bc 6Aa 6Ab 6Ac 6Ba 6Bb

Number of observations in data set = 625

Group	Obs	Dependent Variables
1	598	THDLEN
2	594	THDWT

NOTE: Variables in each group are consistent with respect to the presence or absence of missing values.

Technical Fluazinam: Fathead Minnow F1 Life Cycle
 15:08 Wednesday, September 29, 1999

General Linear Models Procedure

Dependent Variable: THDLEN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	23	731.05296	31.78491	7.56	0.0001
Error	574	2411.86815	4.20186		
Corrected Total	597	3142.92112			
R-Square		C.V.	Root MSE	THDLEN Mean	
0.232603		6.891588	2.0498	29.744	

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	407.96471	81.59294	19.42	0.0001
REP	18	323.08825	17.94935	4.27	0.0001
Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.00000			
REP	18	323.08825	17.94935	4.27	0.0001

Technical Fluazinam: Fathead Minnow F1 Life Cycle
 15:08 Wednesday, September 29, 1999

General Linear Models Procedure
 Least Squares Means

TRT	THDLEN LSMEAN
I	Non-est
II	Non-est
III	Non-est
IV	Non-est
Solvent	Non-est
V	Non-est

Technical Fluazinam: Fathead Minnow F1 Life Cycle
 15:08 Wednesday, September 29, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: THDLEN

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 574 MSE= 4.201861
Critical Value of T= 2.94754

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
I - Solvent	-0.1873	0.5158	1.2190	
I - III	0.0007	0.7026	1.4044	***
I - II	0.0396	0.8375	1.6354	***
I - IV	-0.0120	0.9941	2.0002	
I - V	3.1514	4.5280	5.9045	***
Solvent - I	-1.2190	-0.5158	0.1873	
Solvent - III	-0.5316	0.1868	0.9051	
Solvent - II	-0.4908	0.3217	1.1341	
Solvent - IV	-0.5394	0.4783	1.4960	
Solvent - V	2.6271	4.0121	5.3971	***
III - I	-1.4044	-0.7026	-0.0007	***
III - Solvent	-0.9051	-0.1868	0.5316	
III - II	-0.6764	0.1349	0.9463	
III - IV	-0.7252	0.2915	1.3083	
III - V	2.4410	3.8254	5.2097	***
II - I	-1.6354	-0.8375	-0.0396	***
II - Solvent	-1.1341	-0.3217	0.4908	
II - III	-0.9463	-0.1349	0.6764	
II - IV	-0.9287	0.1566	1.2419	
II - V	2.2550	3.6904	5.1259	***
IV - I	-2.0002	-0.9941	0.0120	
IV - Solvent	-1.4960	-0.4783	0.5394	
IV - III	-1.3083	-0.2915	0.7252	
IV - II	-1.2419	-0.1566	0.9287	
IV - V	1.9730	3.5338	5.0946	***
V - I	-5.9045	-4.5280	-3.1514	***
V - Solvent	-5.3971	-4.0121	-2.6271	***
V - III	-5.2097	-3.8254	-2.4410	***
V - II	-5.1259	-3.6904	-2.2550	***
V - IV	-5.0946	-3.5338	-1.9730	***

Technical Fluazinam: Fathead Minnow F1 Life Cycle
15:08 Wednesday, September 29, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: THDLEN

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 574 MSE= 4.201861
Critical Value of Dunnett's T= 2.279

Comparisons significant at the 0.05 level are indicated by '***'.

TRT	Simultaneous Lower Confidence	Difference Between	Simultaneous Upper Confidence
-----	-------------------------------	--------------------	-------------------------------

Comparison	Limit	Means	Limit	
I - Solvent	-0.0278	0.5158	1.0595	
III - Solvent	-0.7422	-0.1868	0.3687	
II - Solvent	-0.9499	-0.3217	0.3065	
IV - Solvent	-1.2651	-0.4783	0.3085	
V - Solvent	-5.0830	-4.0121	-2.9412	***

Technical Fluazinam: Fathead Minnow F1 Life Cycle
15:08 Wednesday, September 29, 1999

General Linear Models Procedure

Dependent Variable: THDWT					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	23	0.5560780	0.0241773	8.92	0.0001
Error	570	1.5447247	0.0027100		
Corrected Total	593	2.1008027			
R-Square		C.V.	Root MSE	THDWT Mean	
		0.264698	20.68020	0.0521	0.2517

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TRT	5	0.1912507	0.0382501	14.11	0.0001
REP	18	0.3648273	0.0202682	7.48	0.0001
Source	DF	Type III SS	Mean Square	F Value	Pr > F
TRT	0	0.0000000			
REP	18	0.3648273	0.0202682	7.48	0.0001

Technical Fluazinam: Fathead Minnow F1 Life Cycle
15:08 Wednesday, September 29, 1999

General Linear Models Procedure Least Squares Means

TRT	THDWT LSMEAN
I	Non-est
II	Non-est
III	Non-est
IV	Non-est
Solvent	Non-est
V	Non-est

Technical Fluazinam: Fathead Minnow F1 Life Cycle
15:08 Wednesday, September 29, 1999

General Linear Models Procedure

Bonferroni (Dunn) T tests for variable: THDWT

NOTE: This test controls the type I experimentwise error rate but generally has a higher type II error rate than Tukey's for all pairwise comparisons.

Alpha= 0.05 Confidence= 0.95 df= 570 MSE= 0.00271

Critical Value of T= 2.94763

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
I - Solvent	-0.015226	0.002666	0.020557	
I - II	-0.016513	0.003752	0.024016	
I - III	-0.007588	0.010237	0.028062	
I - IV	0.005707	0.031471	0.057235	***
I - V	0.058324	0.094783	0.131241	***
Solvent - I	-0.020557	-0.002666	0.015226	
Solvent - II	-0.019576	0.001086	0.021749	
Solvent - III	-0.010705	0.007571	0.025847	
Solvent - IV	0.002727	0.028805	0.054883	***
Solvent - V	0.055436	0.092117	0.128798	***
II - I	-0.024016	-0.003752	0.016513	
II - Solvent	-0.021749	-0.001086	0.019576	
II - III	-0.014120	0.006485	0.027090	
II - IV	-0.000041	0.027719	0.055479	
II - V	0.053136	0.091031	0.128926	***
III - I	-0.028062	-0.010237	0.007588	
III - Solvent	-0.025847	-0.007571	0.010705	
III - II	-0.027090	-0.006485	0.014120	
III - IV	-0.004798	0.021234	0.047267	
III - V	0.047897	0.084546	0.121195	***
IV - I	-0.057235	-0.031471	-0.005707	***
IV - Solvent	-0.054883	-0.028805	-0.002727	***
IV - II	-0.055479	-0.027719	0.000041	
IV - III	-0.047267	-0.021234	0.004798	
IV - V	0.022212	0.063312	0.104412	***
V - I	-0.131241	-0.094783	-0.058324	***
V - Solvent	-0.128798	-0.092117	-0.055436	***
V - II	-0.128926	-0.091031	-0.053136	***
V - III	-0.121195	-0.084546	-0.047897	***
V - IV	-0.104412	-0.063312	-0.022212	***

Technical Fluazinam: Fathead Minnow F1 Life Cycle

15:08 Wednesday, September 29, 1999

General Linear Models Procedure

Dunnett's One-tailed T tests for variable: THDWT

NOTE: This tests controls the type I experimentwise error for comparisons of all treatments against a control.

Alpha= 0.05 Confidence= 0.95 df= 570 MSE= 0.00271

Critical Value of Dunnett's T= 2.279

Comparisons significant at the 0.05 level are indicated by '***'.

TRT Comparison	Simultaneous Lower Confidence Limit	Difference Between Means	Simultaneous Upper Confidence Limit	
I - Solvent	-0.011170	0.002666	0.016501	
II - Solvent	-0.017065	-0.001086	0.014893	
III - Solvent	-0.021704	-0.007571	0.006562	

IV	- Solvent	-0.048972	-0.028805	-0.008638	***
V	- Solvent	-0.120484	-0.092117	-0.063751	***